

WHAT IS CLAIMED IS:

1. A polymer composition preparable by a method comprising combining components comprising:
  - 5 an organic polymer matrix;
  - an inverse emulsion comprising absorbent hydrophilic microparticles, wherein the microparticles when in a substantially nonhydrated form have an average particle size of 10 microns or less, and wherein the microparticles comprise an amine-containing organic polymer selected from the group consisting of a poly(quaternary
  - 10 amine), a polylactam, a polyamide, and combinations thereof;
  - a bioactive agent selected from the group consisting of a silver compound, a copper compound, a zinc compound, and combinations thereof, wherein the silver compound has a solubility in water of at least 0.1 gram per liter in water; and
  - an optional foaming agent;
  - 15 wherein the components are combined in a manner to produce a polymer composition wherein at least a portion of the bioactive agent is incorporated within the microparticles.
2. The polymer composition of claim 1 wherein the microparticles have an
- 20 average particle size of 1 micron or less when in a substantially nonhydrated form.
3. The polymer composition of claim 2 wherein the microparticles have an average particle size of 0.5 micron or more when in a substantially nonhydrated form.
- 25 4. The polymer composition of claim 1 further comprising secondary absorbent particles having an average particle size of greater than 10 microns when in a substantially nonhydrated form.
5. The polymer composition of claim 4 wherein the secondary absorbent particles
- 30 having an average particle size of greater than 10 microns are superabsorbent.
6. The polymer composition of claim 1 wherein the microparticles are superabsorbent.

7. The polymer composition of claim 1 wherein the organic polymer matrix comprises an elastomeric polymer.

5 8. The polymer composition of claim 7 wherein the elastomeric polymer is selected from the group consisting of a polyisoprene, a styrene-diene block copolymer, a natural rubber, a polyurethane, a polyether-block-amide, a poly-alpha-olefin, a (C1-C20)acrylic ester of meth(acrylic) acid, an ethylene-octene copolymer, and combinations thereof.

10

9. The polymer composition of claim 1 wherein the organic polymer matrix comprises a thermoplastic polymer.

15

10. The polymer composition of claim 9 wherein the thermoplastic polymer is a polyolefin.

11. The polymer composition of claim 1 wherein the organic polymer matrix comprises a hydrophilic polymer.

20

12. The polymer composition of claim 11 wherein the hydrophilic polymer is selected from the group consisting of a polysaccharide, a polyether, a polyurethane, a polyacrylate, a polyester, and combinations thereof.

25

13. The polymer composition of claim 1 wherein the amine-containing organic polymer microparticles comprises a quaternary ammonium salt of an organic polymer.

30

14. The polymer composition of claim 13 wherein the microparticles comprise a cationic homopolymer of the methyl chloride quaternary salt of 2-(dimethylamino)ethyl methacrylate.

15. The polymer composition of claim 1 further comprising an additive selected from the group consisting of a plasticizer, a tackifier, a crosslinking agent, a stabilizer,

an extruding aid, a filler, a pigment, a dye, a swelling agent, a foaming agent, a chain transfer agent, and combinations thereof.

5        16.     The polymer composition of claim 15 wherein the additive is a filler comprising fibers.

17.     The polymer composition of claim 1 wherein the organic polymer matrix comprises a mixture of two or more polymers.

10       18.     The polymer composition of claim 1 wherein the microparticles are present in an amount of 1 wt-% to 60 wt-%, based on the total weight of the polymer composition.

15       19.     The polymer composition of claim 1 wherein the composition includes water in an amount of 5 wt-% to 10 wt-%, based on the total weight of the polymer composition.

20.     The polymer composition of claim 1 in the form of an extruded film.

21.     The polymer composition of claim 1 in the form of a foam.

20       22.     The polymer composition of claim 1 further comprising a foaming agent.

23.     The polymer composition of claim 22 wherein the foaming agent is a physical foaming agent.

25       24.     The polymer composition of claim 23 wherein the physical foaming agent comprises thermally expandable microspheres.

25.     The polymer composition of claim 24 wherein the composition is stable.

30       26.     The polymer composition of claim 1 wherein the method further comprises combining the components in the presence of water and removing a substantial portion of the water.

27. A polymer composition comprising a hydrophilic amine-containing polymer having a weight average molecular weight of at least 1000 selected from the group consisting of a poly(quaternary amine), a polylactam, a polyamide, and combinations thereof, and a bioactive agent distributed therein, wherein the bioactive agent is selected from the group consisting of a silver compound, a copper compound, a zinc compound, and combinations thereof, wherein the silver compound has a solubility in water of at least 0.1 gram per liter in water.
28. The polymer composition of claim 27 wherein the bioactive agent has a solubility in water of at least 0.1 gram per liter in water.
29. The polymer composition of claim 28 wherein the bioactive agent is a silver salt.
30. The polymer composition of claim 27 wherein the amine-containing polymer is in the form of particles.
31. The polymer composition of claim 30 wherein the particles when in a substantially nonhydrated form have an average particle size of 10 microns or less.
32. The polymer composition of claim 30 wherein the particles are superabsorbent.
33. The polymer composition of claim 27 wherein the amine-containing polymer comprises a quaternary ammonium salt of an organic polymer.
34. The polymer composition of claim 27 wherein the composition is stable.
35. The polymer composition of claim 27 further comprising a secondary organic polymer.
36. The polymer composition of claim 35 wherein the secondary organic polymer is a hydrophobic material.

37. The polymer composition of claim 36 wherein the hydrophobic material forms a continuous matrix and the hydrophilic amine-containing polymer forms a discontinuous phase.
- 5 38. The polymer composition of claim 37 wherein the hydrophilic discontinuous phase is in the form of microparticles having an average particle size of 10 microns or less when in a substantially nonhydrated form.
39. The polymer composition of claim 37 which is a hydrocolloid.
- 10 40. The polymer composition of claim 39 comprising water in an amount of less than 1 weight percent, based on the total weight of the polymer composition.
41. The polymer composition of claim 36 wherein the hydrophobic material forms a discontinuous phase and the hydrophilic amine-containing polymer forms a continuous matrix.
- 15 42. The polymer composition of claim 36 wherein the hydrophobic material is liquid at room temperature.
- 20 43. The polymer composition of claim 42 wherein the hydrophobic material is mineral oil.
44. The polymer composition of claim 36 wherein the hydrophobic material is solid at room temperature.
- 25 45. The polymer composition of claim 36 wherein the hydrophobic material comprises an elastomeric polymer.
- 30 46. The polymer composition of claim 45 wherein the elastomeric polymer is selected from the group consisting of a polyisoprene, a styrene-diene block copolymer, a natural rubber, a polyurethane, a polyether-block-amide, a poly-alpha-olefin, a (C1-

C20)acrylic esters of meth(acrylic) acid, an ethylene-octene copolymer, and combinations thereof.

5           47.     The polymer composition of claim 36 further comprising a foaming agent.

48.     The polymer composition of claim 47 wherein the foaming agent is a physical foaming agent.

10          49.     The polymer composition of claim 36 wherein the composition is stable.

50.     The polymer composition of claim 36 further comprising a swelling agent.

15          51.     The polymer composition of claim 36 further comprising an additive selected from the group consisting of a plasticizer, a tackifier, a crosslinking agent, a stabilizer, an extruding aid, a filler, a pigment, a dye, a swelling agent, a foaming agent, a chain transfer agent, and combinations thereof.

20          52.     The polymer composition of claim 51 wherein the additive is a filler comprising fibers.

53.     The polymer composition of claim 27 in the form of an extruded film.

54.     A medical article comprising the polymer composition of claim 1.

25          55.     The medical article of claim 54 which is a wound dressing or a wound packing material.

56.     A medical article comprising the polymer composition of claim 27.

30          57.     The medical article of claim 56 which is a wound dressing or a wound packing material.

58.     A medical article comprising the polymer composition of claim 35.

59. The medical article of claim 58 which is a wound dressing or a wound packing material.

5 60. A method of using a polymer composition comprising applying the polymer composition of claim 1 to a wound.

61. A method of using a polymer composition comprising applying the polymer composition of claim 27 to a wound.

10

62. A method of using a polymer composition comprising applying the polymer composition of claim 35 to a wound.

15

63. A method of making a polymer composition, wherein the method comprises:  
combining an inverse emulsion comprising hydrophilic organic microparticles with water and a bioactive agent under conditions effective to distribute at least a portion of the bioactive agent in the hydrophilic organic microparticles, wherein the bioactive agent is selected from the group consisting of a silver compound, a copper compound, a zinc compound, and combinations thereof; wherein the silver compound has a solubility in water of at least 0.1 gram per liter in water.

20

optionally adding a secondary organic polymer to the inverse emulsion comprising the microparticles and bioactive agent; and  
optionally removing a substantial portion of the water.

25

64. The method of claim 63 further comprising subjecting the polymer composition to radiation.

65. The method of claim 63 further comprising extruding or molding the composition.

30

66. The method of claim 63 further comprising blending in a foaming agent.

67. The method of claim 66 wherein the foaming agent comprises thermally expandable microspheres.

5 68. The method of claim 67 further comprising processing the composition under conditions effective to expand the thermally expandable microspheres.

69. The method of claim 67 further comprising processing the composition under conditions that do not significantly expand the thermally expandable microspheres and subsequently exposing the extruded material to conditions effective to expand the  
10 thermally expandable microspheres.

70. A method of making a polymer composition, wherein the method comprises:  
combining monomers for a hydrophilic organic polymer with a bioactive agent  
under conditions effective to polymerize the monomers and distribute at least a portion  
15 of the bioactive agent in the hydrophilic organic polymer, wherein the bioactive agent  
is selected from the group consisting of a silver compound, a copper compound, a zinc  
compound, and combinations thereof; wherein the silver compound has a solubility in  
water of at least 0.1 gram per liter in water; and  
optionally adding a secondary organic polymer to the hydrophilic organic  
20 polymer.

71. A wound dressing comprising an apertured, liquid permeable substrate and the composition of claim 1 wherein the composition is nonadherent.

25 72. A wound dressing comprising an apertured, liquid permeable substrate and the composition of claim 27 wherein the composition is nonadherent.

73. A wound dressing comprising an apertured, liquid permeable substrate and the composition of claim 35 wherein the composition is nonadherent.  
30